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Don't Put All Eggs in One Basket: Subnational Resource Curse and The Need for Economic Diversification in Indonesia 2003-2016*

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Abstract

Resource curse is a concept that has been studied numerously at national level but still very few at sub-national level. We conducted a study on Indonesia that has provinces with varying level of natural resources endowment. We created four quadrants to categorize Indonesia provinces and analyzed the relation between economic diversification and development outcomes. We calculated diversification using Herfindahl Hirsch Index (HHI) for period of 2003 to 2016 and differentiate between provinces with dependency on oil and gas as well as wider category of mining sector. The former experience higher inequality by 0.103%, and higher poverty by 0.03% while the latter category is correlated with slower grow by 0.511%. but experienced higher human deployment index (HDI) abut lower Gini Ratio) by respectively 0.033% and 0.038%. Nevertheless, dependency on mining sector is correlated with lower poverty of 0.142%. The study concluded with recommendations to diversify the economy and optimized the impact of provincial budget.

Keywords: subnational resource curse, diversification index, Indonesia
JEL classification: O44, Q56, Q58, R11, R50

1. Background

Indonesia has experienced three phases of commodity boom, where two of them provided positive benefit for Indonesia's economy. The first is during 1973 – 1974 and the second one is 1979 – 1980. Interestingly, when the oil price slumped after 1980, Indonesia was able to reverse the negative impact of the shock and industrialized the economy with 7% growth during 1980 – 1990. Nevertheless, the same achievement did not appear after the third phase of commodity boom during 2001 – 2012 ended.

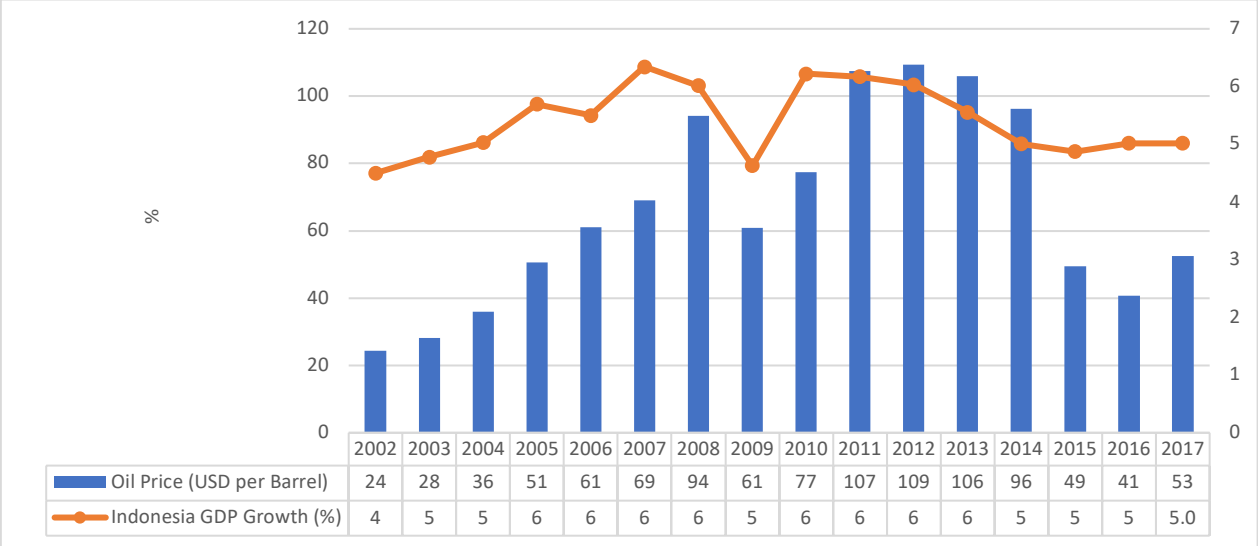
Instead, Indonesia experienced step backward in industrialization, and was not able to reverse the negative impact as we did after the second phase of commodity boom. After 2012, most of economic indicators were deteriorating. Revenues, from the commodity boom, was mainly focused on providing subsidy to cover higher fuel investment as Indonesia's economy was mainly consumption-led economy. High portion of export from extractive export started to create Dutch disease and crowded out other sectors. Moreover, during this commodity boom as well, Indonesia seemed to experience higher inequality and environmental degradation. It indicates that relaying natural resource to sustain economic performance is not a preferred option (Wihardja, 2016)[1]. Other sectors should have been a primary concern from the stakeholders to sustain Indonesia's economy.

The recent slowdown of global economy was driven namely by widening risk exposure from US economic recovery, volatility of commodity prices, slowdown of China's economy that eventually led to slower economic performance in several developing countries, including

* Authors gratefully acknowledged financial support from Natural Resource Governance Institute (NRGI).
[1] Wihardja, MM. (2016). "*The Effect of Commodity Boom on Indonesia's Macroeconomic Fundamentals and Industrial Development*." World Bank Indonesia economist.

Indonesia. China is one of Indonesia's main trading partners, where slowing down economic growth of China led to lower demand upon Indonesia's export products. It would eventually slow down Indonesia's economic performance. In the other hand, Indonesia's economic performance is significantly influenced by dynamics of commodity prices. Among the three factors mentioned in the first sentence of this paragraph, volatility of commodity price has been the main driver of Indonesia's economy through trade activities. Global economic performance has been slowed since 2010 by 4.31%. It slightly grew respectively by 3.18% in 2011, 2.51% in 2012, 2.62% in 2013, 2.86% in 2014, 2.86% in 2015, 2.51% in 2016, before rapidly growing again in 2017 by 3.15[2]. At the same period, Indonesia also experienced slowing down economic growth by up to 2015 by 4.78%, mainly driven by slump in commodity prices and slowing down global economic performance.

Nevertheless, although it might be slower due to global crises, Indonesia's economy has been experiencing some positive growth for the last 7 years, with the exception in 2015 where we had the lowest positive growth by 4.79% (BPS, 2015). This was caused by commodity prices fell and domestic mineral beneficiation policy that required the mining license holders to process the metallic minerals in Indonesia. In 2017, Indonesia positively grew by 5.07%, even it was still below the target by 5.2%. The highest contributor came from export of goods and services by 9.09%. It indicates that manufacturing sector would be beneficial if optimized accordingly, where extractive sector should have served more as input production factor.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Oil Price (USD per Barrel)	24	28	36	51	61	69	94	61	77	107	109	106	96	49	41	53
Indonesia GDP Growth (%)	4	5	5	6	6	6	6	5	6	6	6	6	5	5	5	5.0

Figure 1. Oil Price and Indonesia's Economic Growth

Source: World Bank (2018) and Indonesia Statistic (2018)

As above mentioned, the above figure shows how vulnerable Indonesia's economic growth for the last 16 years due to it reflects the oil prices' cycle. Up to now, Indonesia has been heavily relied on commodities for its export. As the consequences, the boom and bust of commodity prices, especially the shocks can affect Indonesia total export value. The bust period would lower Indonesia's export value and eventually its economic growth as a whole. In the sub-national level, it can be seen that most of resource rich provinces have the same trend with oil prices. For instance, Aceh, a province with high natural resource reserve. Commodity price-driven economy of Aceh is mainly caused by high dependency on extractive resources. The main challenges Aceh has been experiencing about limited sources of oil and

[2] Global Economic Growth 1961 – 2017. https://data.worldbank.org/indicator/ny.gdp.mktp.kd.zg

gas. Aceh has been relying on their economy on the existing oil and mining sites. There are four oil and gas companies that have started the exploration, and planned to start the operation by this 2018. Oil and gas accounts for 68% of the natural resource subsector. In the case of Sumatera Selatan, Bank Indonesia (2017) have released that volatility on oil prices would positively impact economic performance of Sumatera Selatan due to high dependency on this extractive sector.

The similar implications occur in other provinces. The expected performance has never been as the local government seemed to be failed to improve economic performance as whole, failed to improve quality of human capital, and failed to alleviate poverty and reduce social gap. There has been increase in local government expenditure due to increase in revenue sharing from the central government. Portion of natural resource-based revenue sharing to total revenue of local budget accounts for 38.16% for the last 14 years (2002 – 2017) In the regional level, the performance of resource rich provinces after the decentralization reflects similar situation as in the national level. Over the last 14 years the economic growth of 11 resource rich Provinces is very cyclical and moves slightly mirroring the volatility of oil prices. An exception should be given to East Kalimantan performance in 2012 where the growth slumped from 4.09% in 2011 to 3.98% in 2012. This condition was due to the expansion of East Kalimantan Province to North Kalimantan Province in 2012.

When it comes to the role of extractive sector on development, it also comes to revenue-sharing from natural resources. On average, natural resource-based transfer (DBH-SDA), or commonly known as revenue sharing, has been dominant for the last 14 years (2003 – 2016) by 38.16% (DJPK, 2017). This revenue sharing is basically a transfer from central to local government taken from revenue generated from extractive sector activities. The main principle of DBH-SDA is the same with tax-based transfer (DBH-Pajak), general allocation fund (DAU), special allocation fund (DAK), and special autonomy fund (Dana Otsus), which are wealth distribution to sub-nationals (provinces, regencies, and municipalities). As portion of DBH-SDA is larger than any of local government revenue, it indicates the productivity is still dominated by extractive sector. Higher DBH-SDA would lead to significant changes in local government revenue and later expenditure that would be addressed to some strategic sectors to increase local economic performance. The higher the expenditure would consequently drive higher GDP. Nevertheless, does economic performance shows any impact on social indicators? Figures below exhibits trend of local economic growth on local HDI.

Figure 2. GDP Growth and HDI of Natural Resource-Rich Provinces

Source: World Bank (2018) and Indonesia Statistic (2018)

According to the above figures, it can be taken at least two important findings, the first is that most of local economic performances do not have significant impact on improving HDI, and the second is that there only Sumatera Selatan and Maluku Utara that have similar trend of growth between GDP and HDI, where according to the previous section that GDP growths of Sumatera Selatan and Maluku Utara have similar trend with commodity prices. It indicates

government spending, which must be allocated from revenue dominated by natural resource-based revenue sharing has not been optimized so far to improve prosperity.

In national level Indonesia development has lagged in numerous aspects namely human capital and infrastructure development. Abundance of wealth has diminished the growth of renewable sector such as skill-intensive products[3]. Human capital quality contributes significantly to improve skill and technology upgrading that are important to answer the development challenges. It is argued that Indonesia has also lagged in responding the latest opportunity in fulfilling China massive appetite in knowledge and skill intensive intermediary products whereas our competitor such as Malaysia or Vietnam managed to fulfil the slot. Apparently, the revenue streaming from the boom period has not effectively allocated to boost the competitiveness level[4] (Garnaut) and (Wihardja). This situation prevalently exists in the Subnational level.

Constitution has categorized extractive commodities as the public goods with an ultimate goal for the greatest benefit of the people. While resources are inherently non-renewable asset, there are increasing numbers of resource-dependence economic countries who manage these assets as a catalyst for diversifying their economies. These countries attempt to capture potential benefits other than lucrative revenue stream by promoting the growth of cross-sector linkages. Bostwana promotes the downstream diamond cut industry, Finland and Sweden develop lateral linkage for mineral value creation, while Indonesia implements domestic mineral beneficiation as of 2009. These efforts to diversify the economies are important to offset the occurrence of resource curse symptoms and to strengthen the economic resilient.

In Indonesia, the strategy to diversify the economy and capturing other sector linkages are laying in both central and subnational government. Due to decentralisation, resource-rich subnational governments need to acquire knowledge that enables them to produce regional development plan that is more sustainable and resilient in economy. Alongside clear and effective procedure in planning, a room of innovation is also needed to accommodate the fast-growing global trend and technology.

2. Research Objective

Resource rich countries all over the world gradually realized the importance of no longer relying their economy on the natural resources. A country with archipelago characteristic like Indonesia requires a bottom-up strategy to realize development in the long term. In other words, economic performance as a whole would be sustained by its regional economic dynamics (Corona, 2012). According to Callen (2014), economic diversification is one of strategic steps to improve regional economic performance relevant to Indonesia's characteristics, "while waiting for" the central government attempt to build sufficient infrastructure to smoothen economic activities across regions. According to Michael *et al* (2015), economic diversification is basically a process of broadening the range of economic activities both in the production and distribution of goods and services.

Michael *et al* (2015) further expressed that the issue of economic diversification should be viewed from the perspective of sustainable development to ensure long-term stability of the economy. Moreover, according to Abouchakra *et al* (2008) economic diversification is actually linked to economic sustainability. In evaluating economic sustainability, Abouchakra

[3] Ian Coxhead and Muqun Li, *Prospect for Skills-Based Export Growth in a Labour-Abundance, Resource-Rich Economy: Indonesia in Comparative Perspective*, file:///C:/Users/Rani%20Febrianti/Downloads/SSRN-id1124493.pdf,

[4] Ross Garnaut, *Indonesia's Resource Boom in International Perspective: Policy Dilemmas and Options for Continued Strong Growth, The Ninth Sadli Lecture*, Jakarta, 21 April 2015

et al (2008) has statistically proven the impact of economic diversification on the following economic aspects. The first is that poor economic diversity is significantly linked to low productivity and competitiveness. The second is high economic concentration leads to volatile growth and fluctuating economic cycles. The third is volatility in concentrated economies may spawn structural unemployment issues and engender systemic risks. And the fourth is that diversification is critical to sustainable economy.

According to the above description, it is empirically proven that extractive sector would not generate sustainable economic diversification, mainly in sub-national level. Moreover, it would make the country vulnerable towards volatility of commodity prices. In order to avoid significant exposure from externalities i.e. volatility, there have to be improvement on other economic sectors considered to be less-vulnerable towards externalities, such as manufacturing sector. Therefore, there has to be deep analysis on the extent to which the country is economically diversified, description on socio-economic condition resource-dependent provinces, and how to deal with it by improving economic diversification. Thus, it is constructed the following research objectives.

a. Subnational level mapping based on economic diversification level and local natural resource dependency.
b. Brief description on socio-economic condition on resource-rich vs resource-poor provinces
c. Analyzing the impact of natural resource dependency on socio-economic indicators.
d. Analyzing the impact of economic diversification on socio-economic indicators (GDP Growth, Human Development Index, Inequality, and Poverty Rate).
e. Analyzing determinant of economic diversification

The above scope of analysis would be relevant to support the government in formulating policy that is in line with the attempt to diversify the economy in order to achieve sustainable economic performance. By identifying the magnitude of the impact of being dependent on extractive sectors, the government would be able to adjust i.e. fiscal policy to be more economic diversification-oriented. That way, other regional/potential economic potentials can be well-developed to drive sustainable economic growth and to increase prosperity.

3. Methodology

This research employs mixed method, which is the combination of quantitative and qualitative approach. From the quantitative approach, the research employs panel regression to empirically analyze the impact of natural-resource dependency on socio economic indicators, the impact of economic diversification on socio-economic indicators as well as determinant of economic diversification itself to be empirical recommendation for policy makers. Moreover, the qualitative approach would be conducted using literature review and some secondary data analysis to give some examples on socio-economic condition on resource-rich provinces compared to resource-poor provinces. This would provide the linkage between the urgency of economic diversification and what needs to do to improve economic diversification. In details, research method is briefly explained as follow.

Table 1. Research Methodology

Approach	Description	Method	Data
Quantitative	• The impact of natural resource dependency on socio-economic indicators	• HHI Index • Panel Regression using	Secondary Note.

Approach	Description	Method	Data
	• The impact of economic diversification on socio-economic indicators • Determinant of economic diversification	GMM System	Socio Economic Indicators: • Economic performance (*indicated by regional GDP Growth*) • Quality of human capital (*indicated by regional Human Development Index/HDI*) • Social gap or income inequality (*indicated by Gini Ratio*) • Poverty (*indicated by Poverty Rate*)
Qualitative	• Description on trend between price volatility and economic performance • Description on dynamics of socio-economic performance of resource-rich provinces compared to resource poor ones • Description on why revenue-sharing from extractive sector does not positively affect social and economic indicators	• Literature Review • Trend Analysis	

Moreover, the analysis of economic diversification must be preceded by identification of the extent to which a country (from subnational points of view) is economically diversified. In order to identify level of diversification, this research employs Herfindahl Hirschman Index (HHI). The major benefit of HHI is the ability to accurately identify concentration level of various issue. HHI can be used to measure productivity concentration, market concentration, income concentration to support decision making. Li (2015)[5] on his research employed HHI measure to identify level of concentration of insurance sub-sector, mainly property, to the overall insurance industry, and further analyzed the impact of the concentration on China's GDP. Moreover, Grullon, Larkin, and Michaely (2016)[6] also employed HHI to measure concentration of industry in the United States of America in regards with identification whether US industries is more concentrated recently. The result shows that 75% of US industries are more concentrated with high margin of return. Therefore, this research adopted HHI to measure the concentration based on regional (provincial) perspective. The HHI is obtained by the following formula.

$$\sum_{n=1}^{9}\left(\frac{sgdp_{jit}}{gdp_{it}}\right)^2$$

where

$sgdp$ is sectoral GDP, gdp is Gross Domestic Product, j is type of sectors, i provinces, and t is time. High HHI score indicates low economic diversification.

[5] Li, Qianqian. 2015. "*Analysis of the Relationship Between Industry Concentration and GDP Growth: China's Property Insurance Industry*." The Open Cybernetics & Systemics Journal, 2015, 9, 1530-1534

[6] Grullon, G. Larkin, Y. Michaely, R. 2016. "*Are US industries Becoming More Concentrated?*" Rice University Press.

Furthermore, the analysis would be continued with the analysis of the impact of natural resource dependency and economic diversification on socio-economic indicators. The analysis is conducted using panel regression based in the following model

$$y_{it} = \alpha_0 + \beta_j x_{it} + \gamma_j z_{it} + \theta k_{it} + \varepsilon_{it}$$

where y_{it} is macroeconomic and social indicators (GDP, GDP mining ratio, HDI, Poverty, and Gini Ratio), x_{it} is regional HHI Index, z_{it} is local government expenditure variables (agriculture, infrastructure, education, health, social, personnel, and capital expenditures), k_{it} = Ratio of GDP Oil, Gas, and Mining to Total GDP ε_{it} error term (basically a variable in a statistical model which is created when the model does not entirely represent actual relationship between independent and dependent variables).

In the analysis of the correlation between HHI and several important macroeconomic performance indicators, empirical model also consists of number of controlling variables from sub-national/local expenditures. Controlling variables are required to improve robustness of the model when variables to analyze are considered to be too little (Munoz and Young, 2017)[7]. Main variables to analyze of this research includes social and economic indicators, level of economic diversification (HHI), and natural resource dependency (GDP Oil, Gas, and Mining Ratio), thus the model requires some additional and relevant variables mentioned in this paragraph. Local expenditures are chosen to be controlling variables as theoretically, performance of socio-economic indicators is significantly influenced by the government's fiscal policy (Engen and Skinner, 1992)[8]. Therefore, detail variables of this research are exhibited by the following table.

Table 2. Variable and Data

ASPECTS	DESCRIPTIONS	DATA
TYPE OF RESEARCH	Quantitative-based	
ANALYSIS	HHI Index Calculation	
	Panel-Regression and Ganger Causality	
DATA – SECONDARY	Local Sectoral GDP Growth	Badan Pusat Statistik (BPS)
	Human Development Index	Badan Pusat Statistik (BPS)
	Gini Ratio	Badan Pusat Statistik (BPS)
	Poverty Rate	Badan Pusat Statistik (BPS)
	Local Agriculture Expenditure	DJPK Ministry of Finance 2017
	Local Infrastructure Expenditure	DJPK Ministry of Finance 2017
	Local Education Expenditure	DJPK Ministry of Finance 2017

[7] Munoz, J. Young, C. 2017. "*We Ran 9 Billion Regressions Eliminating False Positive through Computational Model Robustness.*" Department of Sociology, Stanford University, Stanford, CA, USA.
[8] Engen, EM. Skinner, J. 1992. "*Fiscal Policy and Economic Growth.*" NBER Working Paper #4223, December 1992.

ASPECTS	DESCRIPTIONS	DATA
	Local Health Expenditure	DJPK Ministry of Finance 2017
	Local Social Expenditure	DJPK Ministry of Finance 2017
	Local Personnel Expenditure	DJPK Ministry of Finance 2017
	Local Capital Expenditure	DJPK Ministry of Finance 2017

Source: Author's Tabulation (2018)

4. Result and Analysis

4.1 Subnational Mapping Based-on Level of Diversification and Resource Dependency

The analysis is preceded with identification of regional diversification level. According to Figure 1 below, it is seen that in 2016, the most concentrated (least-diversified) economy is Kepulauan Riau, while the least-concentrated economy (most-diversified) is Jawa Barat.

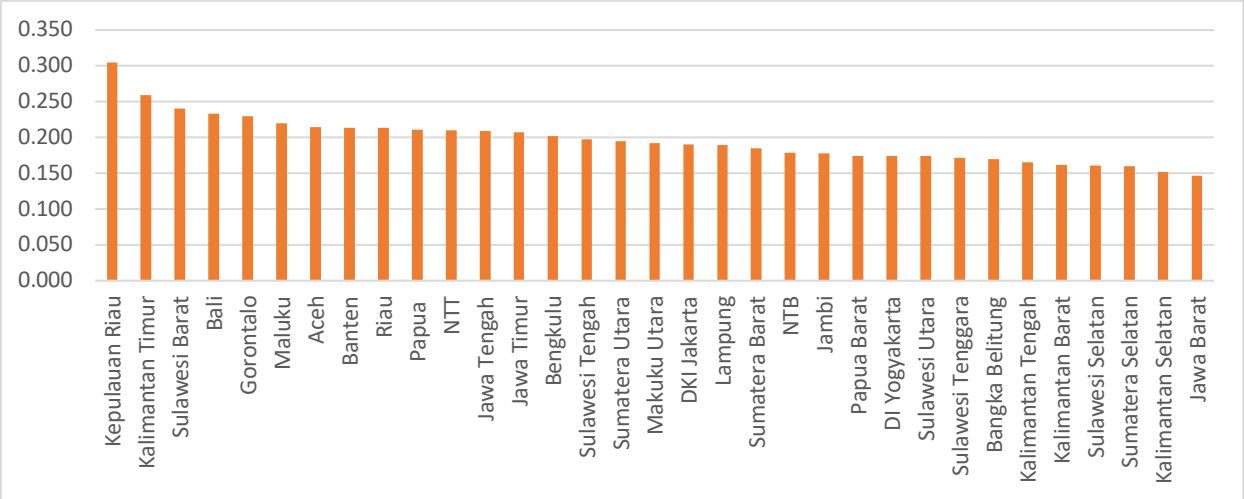


Figure 3 Provincial HHI Score 2016

Source: BPS, process by authors

According to the HHI measurement, it is found that HHI score of Kepulauan Riau is 0.305, while HHI score of Jawa Barat is 0.145. According to BPS (2018) the average ratio of GDP natural resources (oil, gas, and mining) to total regional GDP is 15.7% in along 2003 - 2016. Kepulauan Riau is blessed with various type of extractive resources such as oil and gas and minerals (tin, bauxite, and iron sand) as well as other materials such as granite, sand and quartz. Nevertheless, when it comes abundance of natural resources, Sumatera Selatan and Kalimantan Timur are the two provinces that have taken serious concern from the government in regards with analysis of extractive sector performance on socio-economic indicators. In the case of Sumatera Selatan, the ratio of regional GDP mining to total regional GDP is 22.6% along 2003 – 2016, while the ratio of oil and gas to total regional GDP is 26.8% in the same periods.

Moreover, in the case of Kalimantan Timur, the average ratio of regional GDP mining accounts for 44.8% to total regional GDP, while the average ratio of oil and gas to total regional

GDP accounts for 45.3% along 2003 – 2016. It means along 2003 – 2016, average ratio of regional GDP extractive sector to total regional GDP of Sumatera Selatan and Kalimantan Timur are respectively 49.4% and 90.1%. Therefore, these two provinces would be further analyzed to provide descriptions on how they actually achieved their economic and social performances. Details of economic diversification level and annual regional ratio of GDP extractive sectors to regional GDP is exhibited in Appendix 1 to 3. Moreover, the following Figure 2 exhibits changes in level of diversification.

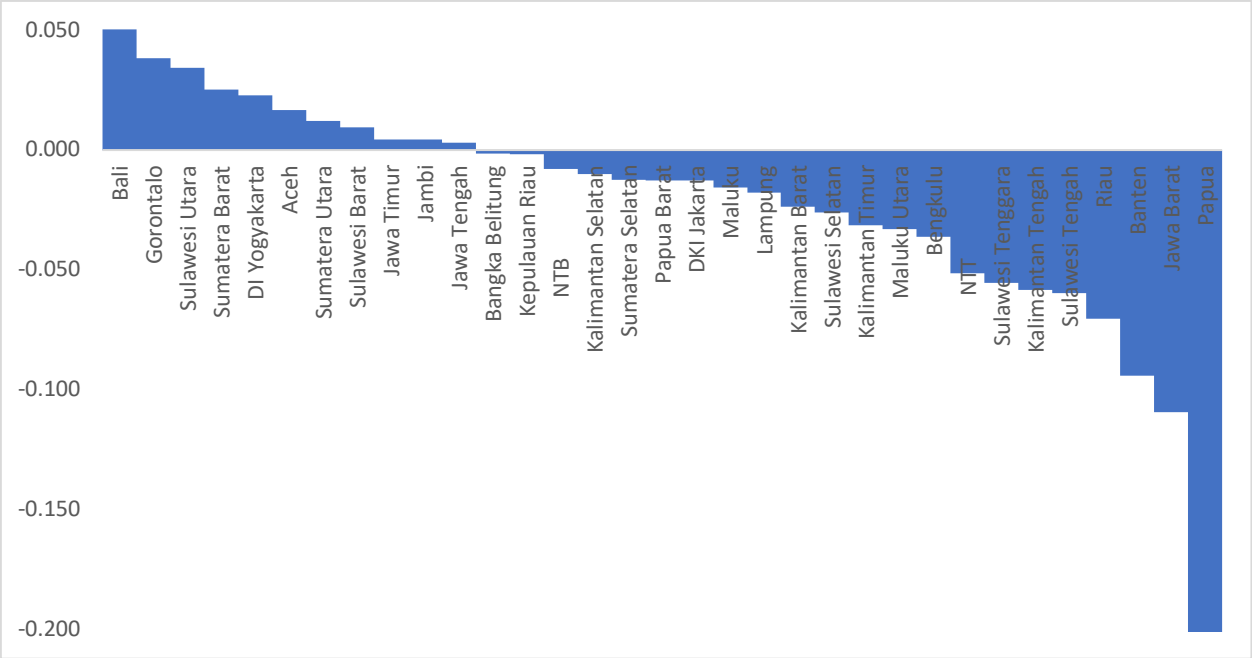


Figure 4. Changes in Provincial HHI Score 2003 - 2016

Source: BPS, process by authors

According to the above Figure 2, it is seen that Bali, as the province with very low dependency on natural resource, experienced the most rapid changes towards economic concentration, while Papua, as one of provinces with high dependency on natural resources, tends to be more diversified rapidly. Bali actually improves their economic performance through development of tourism sector. And the local government of Bali decides to keep improving this tourism sector[9], besides other sector such as agriculture. In the other hand, Papua experienced rapid changes to be more diversified, even its GDP extractive sector ratio places the 4th largest compared to other provinces. In 2017, Papua's economy grew slowly by 4.64% compared to the previous period by 9.14% due to contraction in mining sector by 13.4% in 2017. Nevertheless, interestingly information and communication sector grew rapidly by 6.99%. It indicates that Papua's economy has gradually shifted to other sectors considering their economy is very vulnerable towards volatility in mining sector. Provinces in Indonesia have different level of economic diversification and dependency on natural resources. Dependency on natural resources is considered high if the ratio reaches 20% above (World

[9] Central Bureau of Statistics Bali (2018). https://bali.bps.go.id/subject/52/produk-domestik-regional-bruto--lapangan-usaha-.html#subjekViewTab3 accessed 7 February 2018. 10.13 am

Bank in Gylfason and Zoega, 2001)[10]. The following table exhibits regional mapping based on the combination of level of economic diversification and natural resource dependency.

Table 3. Regional Mapping based-on Level of Diversification and Dependency on Natural Resources.

	High Natural Resources	Low Natural Resources
High HHI Index (Low Economic Diversification)	• Riau • Kalimantan Timur • Papua	• Bengkulu • Kepulauan Riau • Jawa Barat • Banten • Nusa Tenggara Timur • Sulawesi Tengah • Sulawesi Barat • Maluku • Maluku Utara
Low HHI Index (High Economic Diversification)	• Aceh • Jambi • Sumatera Selatan • Bangka Belitung • Nusa Tenggara Barat • Kalimantan Selatan • Papua Barat	• Sumatera Utara • Sumatera Barat • Lampung • DKI Jakarta • Jawa Tengah • DI Yogyakarta • Jawa Timur • Bali • Kalimantan Barat • Kalimantan Tengah • Sulawesi Utara • Sulawesi Selatan • Sulawesi Tenggara • Gorontalo

Source: Author's Tabulation.

Furthermore, the next step is to identify trend of economic diversification and socio-economic performance. As mentioned above, socio-economic indicators of this research are economic growth (GDP growth), quality of human capital (HDI), social gap and income inequality (Gini Ratio), and poverty (POV). The trends are exhibited by the following figure.

[10] World Bank in Gylfason, T. Zoega, G. 2001. "*Natural Resources and Economic Growth: The Role of Investment.*" Faculty of Economics, University of Iceland.

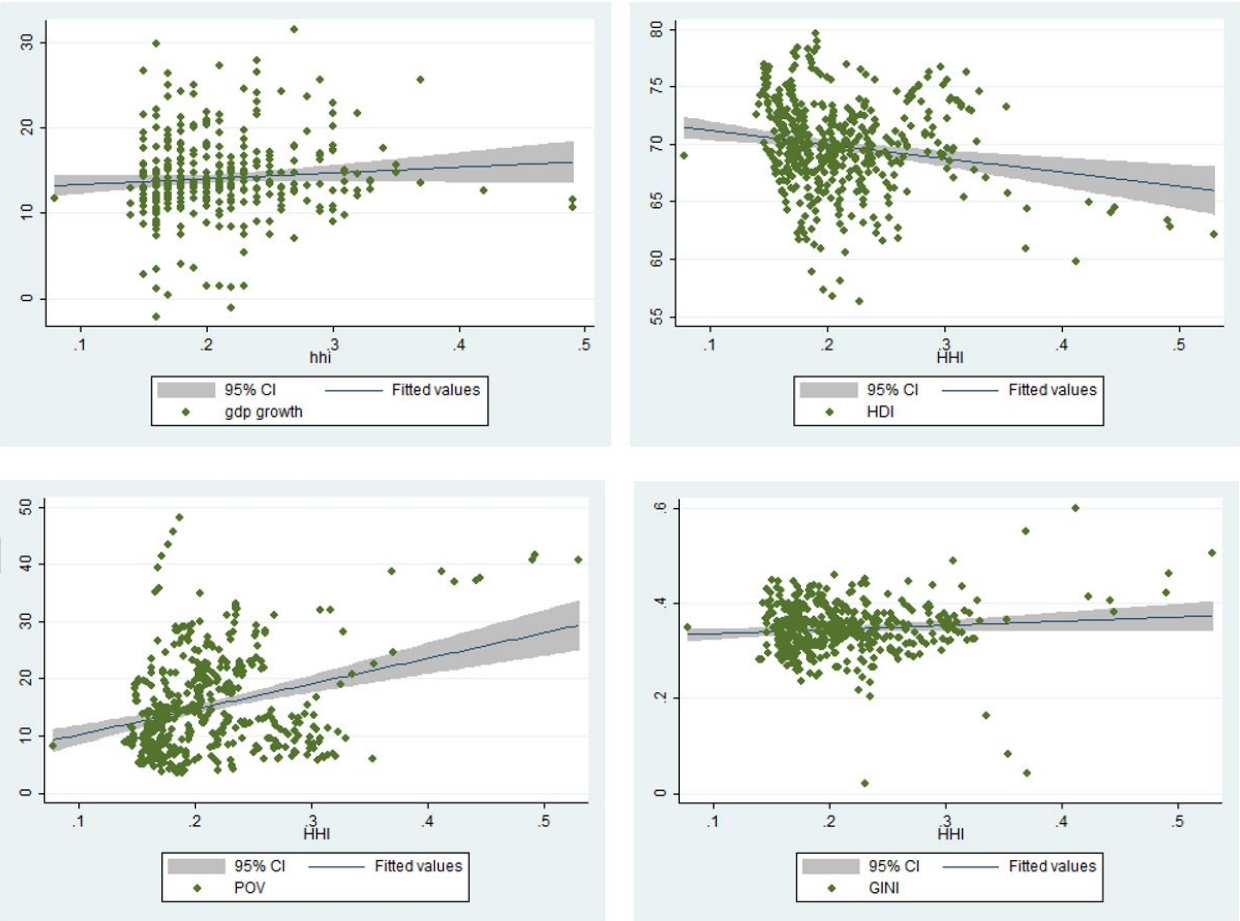


Figure 5. Trends Between Economic Diversification and Socio-Economic Indicators

Source: STATA 14 (data processing)

According to the above figure, it is seen that high HHI score, which means lower economic diversification, would perform undesired impact of socio-economic performance. Lower economic diversification would generate lower quality of human capital (Human Development Index), increase social gap and income (Gini Ratio), and increase poverty (POV). The increase in economic growth is not actually a positive signal, as the higher productivity in dominant sector (that leads to economic concentration) would consequently drive higher total economic growth (*ceteris paribus*).

4.2 Socio-Economic Conditions of Resource-Rich vs Resource Poor Provinces

The level of natural resource dependency is indicated by ratio of GDP Mining, Oil, and Gas by more than 20%. The research was based on provincial level with different level of natural resource dependency. Of the 34 provinces in Indonesia, there are 29.4% provinces with high dependency on natural resource. Those provinces are Riau, Kalimantan Timur, Papua, Aceh, Jambi, Sumatera Selatan, Bangka Belitung, Nusa Tenggara Barat, Kalimantan Selatan, and Papua Barat. The detail is exhibited by the following table.

Table 4. Average Ratio of Natural Resources to GDP 2003 - 2016

Provinces	Natural Resource Ratio to GDP (2003 – 2016)
Kalimantan Timur	90.09%

Riau	77.40%
Papua Barat	53.28%
Papua	51.24%
Sumatera Selatan	49.37%
Aceh	39.93%
Jambi	32.39%
Nusa Tenggara Barat	24.79%
Kalimantan Selatan	23.58%
Bangka Belitung	20.31%

Source: BPS (2018)

In order to provide initial implication regarding the role of extractive sectors on socio-economic performance, figure below shows the performance between resource-rich provinces (The ratio of regional GDP Oil, Gas, and Mining sectors to total regional GDP is above 20%) and resource-poor provinces (The ratio of regional GDP Oil, Gas, and Mining sectors to total regional GDP is below 20%) according to their development outcomes and diversification index. It can be seen that the abundance of resources correlates negative mainly on economic growth and positively on poverty rate along 2011 to 2016.

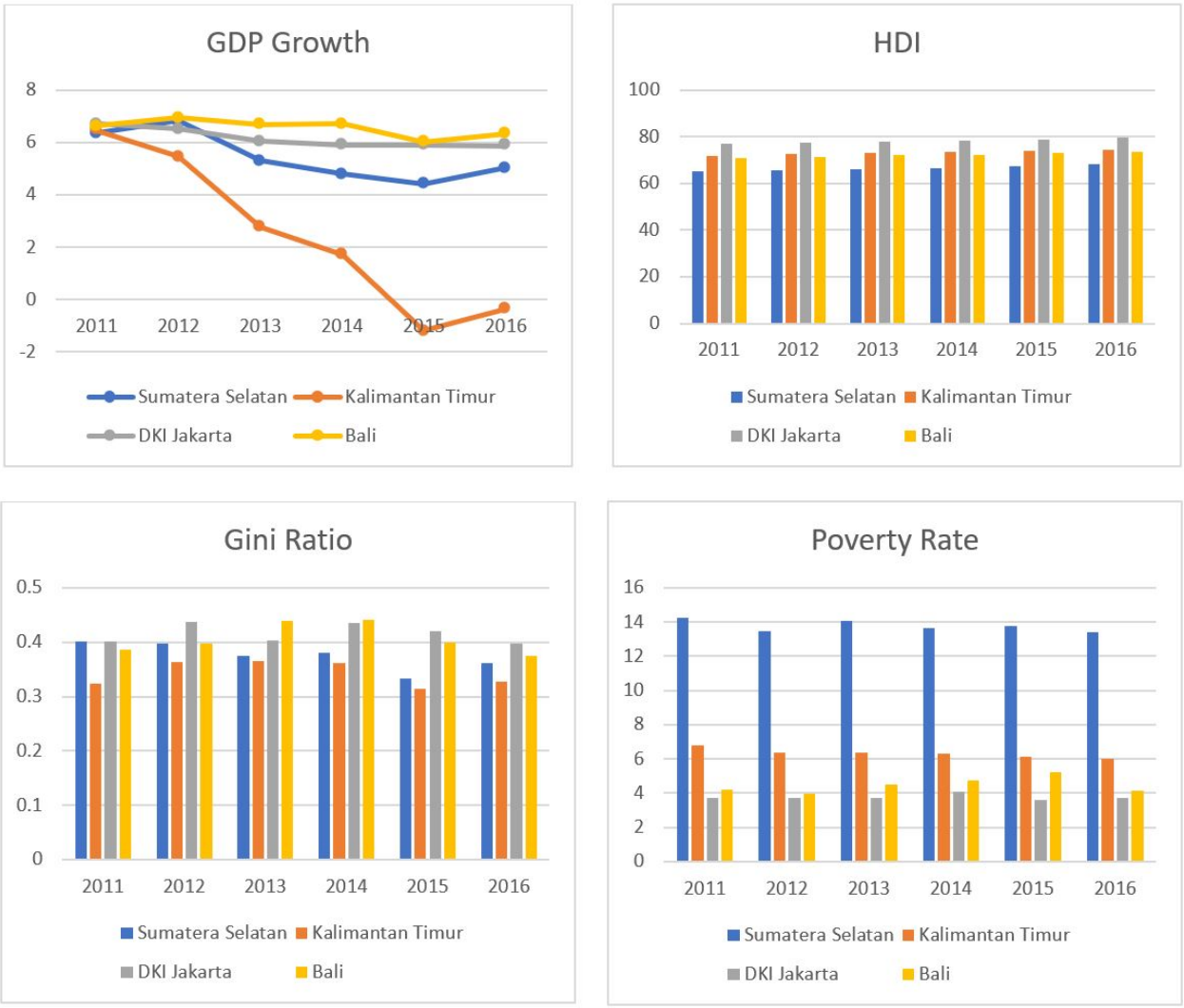


Figure 6. Socio-Economic Performance of Resource-Rich vs Poor Provinces

Source: BPS (2018)

In the context of sub-national level, Kalimantan and Sumatera are two most-impacted provinces as they are dependent so much on commodities to boost their economic performance. According to the above figure, Sumatera Selatan and Kalimantan Utara have performed lower economic growth by respectively 5.46% and 2.48% in average along 2011 – 2016, compared to economic growth of resource-poor provinces such as DKI Jakarta and Bali by respectively 6.17% and 6.57% in average along 2011 and 2016. Moreover, resource-rich provinces tend to have higher poverty rate compared to those that are resource-poor. The average poverty rate along 2011 – 2016 of Sumatera Selatan and Kalimantan Timur are respectively 13.76% and 6.32%, compared to those with poor resources such as DKI Jakarta and Bali by respectively 3.77% and 4.47%. In the other hand, HDI level is quite various among the chosen provinces. DKI Jakarta as resource-poor province has the highest HDI by 78.26, while the lowest one is Sumatera Selatan as the resource-rich province by 66.59% along 2011 – 2016. The above findings, once again, prove that dependency on natural resources would be unsustainable for socio-economic performance in the long-term.

According to the previous section, the increase in economic concentration (less-diversified) would negatively affect human development index, where according to Solow and Swan (1992), economic growth can actually be performed if the capital accumulation is moderated by high skill/knowledge of the human capital, more than increasing their number. This finding implies economic diversification as an urgent agenda for the policy makers to sustain the economy, instead of merely relying on one economic sector, mainly natural resources. In order to empirically analyze the impact of natural resource dependency on socio-economic indicators, the impact of economic diversification on socio-economic indicators, as well as determinant of economic diversification, it is used panel regression result analysis as exhibited by the following table.

Table 5. Panel Regression Output

	HHI INDEX		GDP		HDI		GINI RATIO		POVERTY	
	coeff	sig	coeff	sig	coeff	sig	coeff	sig	coeff	sig
hhi			0.4578		-0.1246	***	-0.1378		-0.6923	***
hhi lag 1	0.5723	***	-0.0903		0.0423	**	0.3156	**	-0.3520	*
tax-based transfer	0.0113	**	-0.2196	***	0.0060	***	-0.0162		0.0590	**
natural resource-based transfer	0.0010		0.0763	***	-0.0060	***	0.0506	***	-0.0640	***
general allocation funds	0.0000		-0.0172	***	0.0010	***	-0.0089	***	0.0218	***
special allocation funds	-0.0023		-0.2839	***	-0.0041		0.1350	***	0.0161	
tax revenue	-0.0077		-1.8453	***	-0.0096		0.1976		-2.2203	***
local revenue	-0.0059		2.9838	***	-0.0256		-0.0409		1.4132	***
total local government revenue	-0.0267		-6.9384	***	0.3022	***	0.4361	**	-1.2930	***
agriculture expenditure	-0.0193		0.0249		0.0167	***	-0.1321	***	-0.0135	
infrastructure expenditure	-0.0078		0.1098	*	0.0070	***	0.0053		-0.0649	**
education expenditure	0.0383	*	0.3312		0.0508	***	-0.1013		0.5173	***
health expenditure	0.0266	*	-0.0565		-0.0184	***	0.1584	***	0.0099	
social expenditure	0.0116		-2.7649	***	0.0611	**	-0.6778	***	1.2349	***
personnel expenditure	-0.0401	**	-1.1536	***	0.0139	*	0.0799		-0.5599	***

	HHI INDEX		GDP		HDI		GINI RATIO		POVERTY	
	coeff	sig	coeff	sig	coeff	sig	coeff	sig	coeff	sig
capital expenditure	0.0052		-0.0556		0.0009		-0.0592	***	-0.0188	
total gdp	0.0015				0.0150	***	0.0256	***	0.0067	
total gdp lag 1			0.4066	***						
gdp mining	0.0461	***	1.2074	***	-0.0359	***	0.0323		-0.0773	
gdp manufacturing	0.0311	***	0.5748	***	0.0151	***	-0.0813	**	0.2223	***
gdp oil and gas	-0.0177	**	0.9271	***	-0.0436	***	0.0183		0.0541	
hdi	-0.2465	***	8.4693	***			1.1773	***	-3.7646	***
hdi lag 1					0.2293	***				
gini ratio	-0.0084		0.8797	***	0.0474	***			-0.1528	***
gini ratio lag 1							0.2970	***		
poverty	-0.0167	***	0.1042	***	-0.0281	***	0.0185	*		
poverty lag 1									0.5304	***
dummy local expansion	-0.0221	***	0.1811	***	-0.0045		0.0012		-0.2439	***
dummy kalimantan	0.0007		-0.5129	***	0.0114	***	-0.0011		-0.1532	***
dummy eastern Indonesia	-0.0288	***	0.1886	**	-0.0352	***	0.1585	***	-0.0851	**
dummy sulawesi	0.0159	***	-0.5472	***	0.0176	***	0.0919	***	0.1411	***
dummy sumatera	-0.0054		-0.5398	***	0.0332	***	-0.0454	***	0.0123	
dummy mining	0.0223	***	-0.5113	***	0.0327	***	-0.0376	***	0.1416	***
dummy oil and gas	-0.0115	***	0.0079		-0.0099	***	0.1029	***	0.0331	*
_cons	1.1330	***	-16.5571	***	2.9363	***	-6.7776	***	17.3624	***
chi2 - stat		2173.9		18859.8		13598.5		1596.7		13191.1
prob - chi2		0.0000		0.0000		0.0000		0.0000		0.0000
adj - R2		0.7931		0.9102		0.8336		0.6377		0.8973

Source: STATA 14 (data processing)

Based on the above result, it can be empirically further analyzed the important aspects to support the urgency of economic diversification. The first one is the impact of natural resource dependency on socio-economic indicators, the second one is the impact of economic diversification on socio-economic indicators, and the third one is determinant of economic diversification.

4.2 The Impact of Natural Resource Dependency on Socio-Economic Indicators

In this section, dependency on natural resources is divided into dependency on oil and gas, and the second is dependency on mining sectors. According to the above table, it can be concluded that dependency on oil and gas does not perform significant impact of economic growth (GDP). In the other hand, such dependency would perform negative impact on the quality of human capital (HDI) significantly by 0.001%. Moreover, dependency on oil and gas would increase social gap and income inequality significantly by 0.103%, and increase poverty significantly by 0.03%. Moreover, dependency on mining sector tends to provide a bit different result compared to dependency on oil and gas. If a province is dependent on mining sector, the economy would negatively grow by 0.511%. Interestingly, such dependency would increase quality of human capital (HDI) and decrease social gap and income inequality (Gini Ratio) by respectively 0.033% and 0.038%. Nevertheless, dependency on mining sector would increase poverty (POV) by 0.142%.

There is different direction in terms of the impact of dependency on oil & gas and mining on quality of human capital (HDI) and social gap and income inequality (Gini Ratio). Dependency on oil and gas tends to be unfavorable on HDI and Gini Ratio, as business process in oil and gas sector needs more competences compared to those in mining. The output of oil and gas lifting cannot be directly sold to end users. It requires further engineering process to convert them into specific type of fuel of other purposes. Local people living in resource-rich provinces do not have sufficient skill to deal with it, thus expert from other provinces (mainly from big provinces such DKI Jakarta and others in Jawa) are "imported" to these provinces, with high remuneration. As the consequences, unskilled local people remained unskilled along the increase of oil and gas production, with the same amount of money they earn for their periodic income when experts or those whose strong network on this sector got the optimal benefit. Thus, quality of local human capital decreases in aggregate, while income inequality widened due to optimal benefit perceived by small number of people.

When it comes to the role of extractive sector in development, it also comes to the role of the revenue-sharing from the natural resource. According to the above table, it can be seen that the revenue-sharing would generate both desired and undesired impacts on socio economic indicators. Higher revenue sharing would significantly drive higher economic growth and reduce poverty by respectively 0.076% and 0.064%. It is not surprising as increase in revenue-sharing would increase spending as component of GDP from expenditure side, thus the economy positively grows. Of the government spending, there is component of social protection program in the form of cash and non-cash grants for poor family, that would automatically increase their consumption above the poverty line, still, it happens in the short-term and the ultimate goal of spending is not merely on where to spend it, but how to spend it. The term "how to spend it" output can be seen from the impact of the revenue-sharing on social indicator, as public is actually the target of the policy. The result shows that increase in revenue sharing would significantly reduce the quality of human capital by 0.006% and significantly increase income inequality by 0.051%. It can be seen that extractive sector still does not perform desired outcome to improve prosperity.

Furthermore, dependency on both sectors (oil & gas and mining) must generate unfavorable impact on economic growth and poverty. High dependency on these sectors would not drive higher economic growth, it would even lower it, and also would increase poverty rate. This is strong indication that an economy concentrated on extractive sectors would not be sustainable to drive desired economic performance. Therefore, economic diversification should have been addressed to create prosperity. Improvement on other sectors would not only diversify potential risk upon external volatility, but also engage more human capital to contribute. In the long-term, it would gradually increase quality of human capital as well as reducing poverty and income inequality.

4.3 The Impact of Economic Diversification on Socio-Economic Indicators

Economic diversification is positive alternative for emerging economy with high dependency on natural resource such as Indonesia. According to the above table, it is seen that lower economic diversification (indicated by higher HHI score) does not have any impact on economic growth (GDP). However, it is shown that quality of human capital would significantly affected. Higher HHI score (lower economic diversification) significantly perform positive impact oh HDI in lag one period by 0.0423%, however it turns to be negative and significant impact on HDI in the current period by 0.1246%. It shows negative impact on the current period is larger than positive impact in lag one-year period, thus it is considered to be negative impact by 0.0823%.

Increase in HHI score (concentrate economy) tends to provide favorable outcome in the form of poverty reduction by respectively 0.3520% in lag one-year period and 0.6923% in the current period. It makes sense as higher productivity of extractive sectors require more labor, especially those unskilled labor, to support some aspects from operational activities. Therefore, they earned income, and poverty rate decreases. Nevertheless, decrease in poverty is not accompanied by decrease in income inequality. Higher economic concentration would drive higher income inequality by 0.3156%. It makes sense as higher productivity of dominant economic sector would provide optimal benefit for those highly-skilled labor with number that must be less than those unskilled labor. As the consequences, even poverty rate decreases due higher productivity in extractive sector, income inequality rises along with increase in extractive sector productivity.

4.4 Determinant of Economic Diversification

According to the previous section, it is empirically confirmed that economic diversification is an urgent agenda to do. It can be seen from two approaches, the first recommendation based in the above empirical findings, and the second one is elaboration on those findings. When it comes to extractive sectors of natural resources, it comes to revenue-sharing from extractive sector to local government to be used for regional development. Interestingly, revenue-sharing from extractive sectors does not perform significant impact on improving economic diversification. That is why the quality of revenue-sharing has to be improved to support economic diversification. Instead of targeting extractive output for trade, it should have served to sustain other sectors with higher value-added. Earmarking policy in revenue-sharing mechanism is one of alternative to optimal this revenue.

5. Conclusion

5.1 Summary

Indonesia is a country with high regional dependency on natural resources. It can be seen from the positive trend between economic growth and volatility of commodity prices. Dependency on natural resources/extractive sectors would generate undesired impact in the long term. It can be seen from both qualitative and quantitative approaches employed in this research. Referring to the case of Sumatera Selatan and Kalimantan Utara, as provinces with high ratio of oil, gas, and mining on total GDP, their economic performance tends to be lower compared to those which are resource-poor provinces such as DKI Jakarta and Bali. Sumatera Selatan and Kalimantan Utara have performed lower economic growth by respectively 5.46% and 2.48% in average along 2011 – 2016, compared to economic growth of resource-poor provinces such as DKI Jakarta and Bali by respectively 6.17% and 6.57% in average along 2011 and 2016. Moreover, resource-rich provinces tend to have higher poverty rate compared to those that are resource-poor. The average poverty rate along 2011 – 2016 of Sumatera Selatan and Kalimantan Timur are respectively 13.76% and 6.32%, compared to those with poor resources such as DKI Jakarta and Bali by respectively 3.77% and 4.47%. In the other hand, HDI level is quite various among the chosen provinces. DKI Jakarta as resource-poor province has the highest HDI by 78.26, while the lowest one is Sumatera Selatan as the resource-rich province by 66.59% along 2011 – 2016.

Furthermore, empirical analysis performed interesting findings. The first one is dependency on natural resources must generate unfavorable impact on economic growth and poverty. High dependency on these sectors would not drive higher economic growth, it would even lower it, and also would increase poverty rate. This is strong indication that an economy concentrated on extractive sectors would not be sustainable to drive desired economic performance. Therefore, it implies economic diversification should have been promoted to

drive the expected performance of the economy. This implication is strengthened by the empirical finding that higher economic diversification would improve quality of human capital (HDI) and reduce income inequality, two aspects that have been primary concern in economic issues, more than merely economic growth. Moreover, revenue-sharing outcome from extractive sectors is also unfavorable. Higher revenue-sharing would significantly drive lower quality of human capital (HDI) and increase income inequality. Interestingly, the urgency of economic diversification and the impact of revenue-sharing has similar significant outcome, which are on quality of human capital and income inequality/social gap. Therefore, in order to promote economic diversification, revenue from extractive sectors should have been optimized to drive and improve performance of other sectors.

5.2 Improving the Quality of Resource-based Revenue Sharing (DBH SDA)

As mentioned in the above sections, in average revenue sharing from extractive sector accounts for 38.16% of total local revenue. Thus, the revenue sharing plays important role on level of spending, including if possible, increase the quality of spending. Revenue sharing would mathematically increase value of local spending. But to make it perform positive contribution towards development indicators, then spending where revenue comes from extractive productions (DBH-SDA) should have been directly allocated to sectors that need it the most to improve. This policy is called earmarking policy.

OECD Policy Dialogue on Natural Resource-Based Development (2017) has basically conducted series of discussion on the possibility of earmarking to be implemented for revenue spending from extractive sectors. According to the report, there are some points to address the importance of earmarking natural resource revenue as follow.

a. To draw greater public attention to the use of natural resource revenues for longer-term benefits, such as improving health and education outcomes or the quality of infrastructure. This rationale is relevant to the case of Indonesia considering dependency on natural resources mainly oil and gas, from the national perspective, would decrease HDI, increase social gap, and increase poverty.
b. To address expenditure items that may be typically neglected or vulnerable in the budget-setting process, such as health and education, at the expense of potentially favored budget items (e.g. defense or government salaries).
c. To discourage government from overspending on recurring expenditures that have limited long-term socio-economic benefits for most of the population. This aspect is strongly relevant to Indonesia case as more than 60% of spending is still addressed to personnel spending. For instance, education sector in the sub-national level. Budget for education sector accounts for Rp. 419 trillion in 2017. Of the total budget, Rp. 261 trillion is transferred to the local government. Ironically, 94.6% is allocated for salary and allowances. The rest Rp. 7.7 trillion is the rest allocated to improve the quality of education infrastructure.
d. To address the volatility and finite nature of natural resource revenues by focusing expenditure on appropriate uses, and limit permanent increases in overall expenditure.
e. To protect the financial autonomy of some institutions

5.3 What to do next?

Considering huge economic potential of Indonesia's economy, then natural resource revenue sharing should be optimized for two important aspects, the first is to improve development indicators (improve HDI, lower Gini Ratio, and lower poverty rate) and the second is to improve other potential sectors rather than just focusing on natural resource,

called economic diversification. In regards with budgeting, National Development Agency (Bappenas) and the Ministry of Finance would take strategic responsibilities in the very first place. Positive integration between these two institutions would drive high quality spending. There are three main challenges when it comes to quality spending in the case of Indonesia. The first one is overspending on salary and allowances, the second one is budget absorption (that does not reflect budget efficiency at all) as local financial success indicators, and the third one is weak evaluation system.

The government needs to optimize the principle of "money follow program", where the programs are prepared based on prior study. The second one data on program output has to be gradually completed by all stakeholders (local and central governments) as important input for evaluation. And the third one is regulation simplification has to be continuously and gradually improved to ease the whole process of program implementation. Periodic simulation and evaluation are necessary to make sure that remaining regulations are effective to support the implementation of the strategic programs, including potential earmarking policy to improve quality of natural resource revenue spending through economic diversification and quality improvement of human capital.

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Appendix 1

Regional GDP Mining Ratio to Regional GDP 2003 - 2016 (%)

PROVINCES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Aceh	30.03	24.28	23.12	28.30	22.48	18.87	11.51	11.29	11.60	11.13	13.85	11.86	5.92	4.62
Sumatera Utara	1.18	1.17	1.23	1.27	1.32	1.39	1.37	1.36	1.38	1.32	1.31	1.31	1.32	1.33
Sumatera Barat	3.59	3.52	3.39	3.45	3.44	3.32	3.33	3.17	2.97	2.90	1.41	4.88	4.84	4.54
Riau	44.81	41.56	41.67	42.15	43.39	44.78	38.43	36.80	37.46	35.57	42.21	39.57	30.63	27.93
Jambi	15.66	15.65	18.07	15.86	18.96	25.64	18.31	18.26	19.05	17.38	26.16	24.48	19.00	16.59
Sumatera Selatan	23.64	24.96	28.51	26.12	24.94	25.44	21.04	21.69	22.49	21.32	24.98	23.93	21.84	19.89
Bengkulu	2.99	3.06	3.20	3.25	3.22	3.35	4.57	4.29	4.17	4.20	4.11	4.16	3.97	3.74
Lampung	4.54	4.68	4.99	4.38	3.59	3.13	2.12	2.02	2.09	1.96	6.36	6.11	6.05	6.01
Bangka Belitung	18.95	21.44	23.00	22.04	20.40	18.64	18.19	18.23	16.86	15.77	14.22	13.64	12.79	11.97
Kepulauan Riau	8.34	9.68	9.95	10.53	9.76	9.29	8.77	8.29	7.63	7.39	18.71	18.40	18.45	17.84
DKI Jakarta	0.32	0.36	0.45	0.48	0.47	0.47	0.42	0.43	0.50	0.47	0.28	0.26	0.25	0.25
Jawa Barat	2.92	3.02	3.07	2.73	2.47	2.35	1.92	2.02	2.02	1.86	2.77	2.43	1.28	1.15
Jawa Tengah	0.97	0.96	0.97	1.02	1.00	0.96	0.97	0.97	0.95	0.94	1.94	2.13	2.27	2.46
DI Yogyakarta	0.87	0.83	0.78	0.74	0.79	0.74	0.71	0.67	0.70	0.67	0.58	0.58	0.56	0.54
Jawa Timur	2.00	1.93	2.01	2.06	2.11	2.22	2.22	2.19	2.24	2.08	5.55	5.30	4.03	3.86
Banten	0.11	0.11	0.10	0.10	0.11	0.12	0.13	0.12	0.10	0.10	0.90	0.87	0.81	0.79
Bali	0.68	0.68	0.66	0.69	0.66	0.68	0.65	0.73	0.74	0.79	1.31	1.25	1.10	1.07
NTT	1.56	1.54	1.48	1.42	1.37	1.34	1.31	1.38	1.36	1.37	1.46	1.44	1.41	1.39
NTB	26.91	35.99	36.16	35.34	37.79	30.78	36.11	36.60	26.48	18.63	13.36	11.31	21.11	21.83
Kalimantan Barat	1.27	1.25	1.26	1.23	1.40	1.87	1.92	1.99	2.03	2.00	5.03	4.79	4.91	5.60
Kalimantan Tengah	3.00	3.52	5.36	6.61	6.92	7.74	8.97	8.98	9.57	9.95	19.00	13.26	10.90	10.88
Kalimantan Selatan	21.32	20.88	21.19	21.86	21.70	21.72	21.40	24.10	24.43	23.72	28.82	26.93	23.22	20.87
Kalimantan Timur	37.92	39.61	42.54	41.89	41.62	46.06	45.84	47.54	50.12	47.44	55.21	50.21	45.16	43.34
Sulawesi Utara	5.82	5.17	4.51	4.43	4.39	4.50	4.27	4.12	4.00	3.76	4.95	4.77	4.76	4.83
Sulawesi Tengah	1.73	1.79	2.17	3.00	3.73	4.14	4.04	5.37	6.25	7.15	13.24	9.65	10.57	12.63

PROVINCES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sulawesi Selatan	7.61	8.84	9.10	8.62	8.51	7.28	5.51	6.04	6.07	5.52	6.91	7.11	6.32	5.60
Sulawesi Tenggara	5.12	5.01	4.53	4.05	4.80	4.60	4.28	4.90	6.07	7.76	21.93	19.95	20.89	19.35
Gorontalo	0.75	0.81	0.95	1.01	1.12	1.08	1.15	1.18	1.16	1.15	1.46	1.38	1.32	1.32
Sulawesi Barat	1.20	0.62	0.62	0.61	0.69	0.82	0.88	0.87	0.88	0.89	2.05	2.06	2.21	2.30
Maluku	0.97	0.94	0.90	0.87	0.76	0.76	0.75	0.73	0.78	0.76	3.69	4.01	2.44	2.03
Maluku Utara	4.78	4.67	4.58	4.55	4.87	5.03	5.09	5.16	5.01	4.65	11.95	9.36	8.77	8.39
Papua Barat	18.42	18.50	19.31	17.36	15.98	14.80	13.18	10.22	7.23	6.48	23.14	20.77	19.49	19.13
Papua	61.50	57.53	71.65	68.76	68.72	64.73	65.08	63.15	52.60	46.52	39.28	34.56	32.41	35.50

Source: Central Bureau of Statistics (2017)

Appendix 2

Regional GDP Oil and Gas Ratio to Regional GDP 2003 - 2016 (%)

PROVINCES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Aceh	44.44	40.13	37.76	36.57	30.07	26.29	18.17	16.60	16.07	15.09	13.52	11.93	10.30	8.64
Sumatera Utara	0.79	0.73	0.76	0.74	0.79	0.83	0.80	0.79	0.75	0.66	0.63	0.60	0.58	0.55
Sumatera Barat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Riau	46.75	43.52	43.13	43.25	44.27	46.05	39.75	37.92	38.73	36.80	34.78	32.68	30.53	28.30
Jambi	15.55	15.26	18.16	15.28	18.34	23.83	16.71	16.26	16.81	14.89	13.69	12.47	11.23	9.98
Sumatera Selatan	28.29	29.30	35.33	33.80	31.84	33.34	27.98	26.89	26.01	23.75	22.12	20.46	18.75	17.02
Bengkulu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lampung	3.31	3.17	3.67	2.88	2.36	1.98	1.11	1.14	1.15	1.10	1.16	1.21	1.27	1.33
Bangka Belitung	4.60	4.26	4.49	3.90	2.94	2.68	2.45	2.27	2.09	1.88	1.82	1.76	1.70	1.64
Kepulauan Riau	7.19	8.50	8.71	9.23	8.50	8.08	7.56	7.13	6.52	6.30	6.05	5.80	5.55	5.30
DKI Jakarta	0.32	0.36	0.45	0.48	0.47	0.47	0.42	0.43	0.50	0.47	0.44	0.40	0.37	0.33
Jawa Barat	4.12	4.38	4.77	5.27	4.71	5.74	4.61	4.28	4.28	4.05	3.80	3.56	3.31	3.06
Jawa Tengah	9.15	9.23	13.37	13.81	12.74	14.05	12.73	12.10	11.54	10.55	9.91	9.26	8.61	7.95

DI Yogyakarta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jawa Timur	0.21	0.21	0.22	0.23	0.28	0.30	0.34	0.42	0.46	0.39	0.36	0.34	0.31	0.28
Banten	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bali	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NTB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kalimantan Barat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kalimantan Tengah	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kalimantan Selatan	1.91	1.82	1.61	1.52	1.49	1.39	1.26	1.14	1.03	0.93	0.86	0.78	0.71	0.63
Kalimantan Timur	56.55	59.91	62.22	58.80	55.98	57.36	45.66	40.80	38.12	34.98	33.35	31.69	29.99	28.24
Sulawesi Utara	0.15	0.14	0.10	0.12	0.12	0.12	0.12	0.11	0.11	0.13	0.12	0.11	0.11	0.10
Sulawesi Tengah	0.00	0.00	0.36	1.25	2.04	2.35	1.99	2.05	2.14	2.01	1.55	1.08	0.61	0.13
Sulawesi Selatan	0.20	0.19	0.25	0.24	0.24	0.21	0.20	0.19	0.18	0.16	0.16	0.15	0.15	0.14
Sulawesi Tenggara	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gorontalo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sulawesi Barat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maluku	0.48	0.45	0.42	0.40	0.28	0.29	0.29	0.25	0.25	0.24	0.23	0.22	0.22	0.21
Maluku Utara	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Papua Barat	25.52	29.00	31.41	28.82	28.14	30.03	33.18	47.69	54.19	55.64	55.72	55.80	55.88	55.96
Papua	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Central Bureau of Statistics (2017)

Appendix 3

Regional Herfindahl-Hirschman Index 2003 - 2016

PROVINCES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Aceh	0.197	0.185	0.186	0.183	0.168	0.163	0.162	0.162	0.156	0.158	0.232	0.224	0.214	0.214
Sumatera Utara	0.182	0.181	0.180	0.177	0.176	0.174	0.171	0.170	0.168	0.165	0.195	0.195	0.194	0.194

PROVINCES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sumatera Barat	0.160	0.160	0.162	0.160	0.159	0.160	0.159	0.159	0.160	0.159	0.078	0.183	0.185	0.185
Riau	0.284	0.266	0.268	0.269	0.273	0.279	0.241	0.233	0.229	0.216	0.268	0.253	0.220	0.213
Jambi	0.173	0.168	0.164	0.164	0.162	0.171	0.164	0.172	0.173	0.173	0.182	0.179	0.174	0.177
Sumatera Selatan	0.172	0.173	0.184	0.179	0.175	0.176	0.164	0.165	0.159	0.155	0.170	0.166	0.162	0.159
Bengkulu	0.238	0.239	0.239	0.238	0.241	0.241	0.229	0.237	0.232	0.228	0.205	0.203	0.203	0.202
Lampung	0.207	0.205	0.202	0.202	0.205	0.215	0.218	0.210	0.204	0.205	0.196	0.194	0.192	0.190
Bangka Belitung	0.172	0.175	0.176	0.173	0.170	0.168	0.165	0.163	0.160	0.156	0.174	0.173	0.171	0.170
Kepulauan Riau	0.307	0.289	0.285	0.287	0.280	0.270	0.273	0.278	0.285	0.287	0.321	0.315	0.311	0.305
DKI Jakarta	0.203	0.200	0.195	0.191	0.187	0.187	0.185	0.184	0.171	0.184	0.189	0.191	0.191	0.191
Jawa Barat	0.256	0.244	0.260	0.266	0.264	0.258	0.242	0.225	0.221	0.217	0.263	0.265	0.148	0.146
Jawa Tengah	0.206	0.205	0.208	0.206	0.204	0.211	0.204	0.204	0.206	0.204	0.213	0.214	0.211	0.209
DI Yogyakarta	0.152	0.151	0.149	0.149	0.148	0.148	0.149	0.150	0.150	0.151	0.171	0.173	0.174	0.175
Jawa Timur	0.203	0.204	0.207	0.207	0.207	0.205	0.202	0.203	0.203	0.205	0.207	0.207	0.207	0.207
Banten	0.308	0.302	0.298	0.299	0.286	0.268	0.255	0.250	0.284	0.271	0.231	0.220	0.217	0.214
Bali	0.183	0.183	0.182	0.179	0.178	0.175	0.180	0.181	0.181	0.178	0.220	0.232	0.232	0.233
NTT	0.261	0.260	0.252	0.253	0.252	0.254	0.251	0.247	0.242	0.238	0.210	0.210	0.211	0.210
NTB	0.186	0.216	0.214	0.210	0.221	0.190	0.208	0.211	0.174	0.163	0.176	0.180	0.178	0.179
Kalimantan Barat	0.185	0.185	0.184	0.182	0.182	0.180	0.177	0.175	0.174	0.170	0.166	0.165	0.164	0.162
Kalimantan Tengah	0.224	0.216	0.197	0.196	0.189	0.171	0.168	0.170	0.170	0.170	0.168	0.167	0.167	0.166
Kalimantan Selatan	0.162	0.159	0.156	0.156	0.155	0.154	0.153	0.163	0.157	0.155	0.171	0.165	0.156	0.152
Kalimantan Timur	0.290	0.302	0.324	0.315	0.305	0.330	0.299	0.302	0.319	0.297	0.353	0.310	0.273	0.259
Sulawesi Utara	0.140	0.141	0.143	0.145	0.146	0.147	0.146	0.147	0.147	0.147	0.169	0.172	0.174	0.174
Sulawesi Tengah	0.257	0.258	0.260	0.252	0.250	0.236	0.227	0.221	0.206	0.199	0.199	0.201	0.193	0.198
Sulawesi Selatan	0.187	0.174	0.172	0.169	0.168	0.167	0.166	0.160	0.158	0.157	0.155	0.157	0.159	0.161
Sulawesi Tenggara	0.227	0.227	0.235	0.224	0.208	0.200	0.195	0.185	0.177	0.172	0.178	0.175	0.173	0.172
Gorontalo	0.191	0.183	0.189	0.195	0.194	0.203	0.200	0.198	0.197	0.193	0.231	0.231	0.233	0.230
Sulawesi Barat	0.230	0.370	0.354	0.335	0.326	0.305	0.297	0.303	0.295	0.290	0.247	0.242	0.243	0.240

PROVINCES	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Maluku	0.236	0.235	0.236	0.236	0.235	0.234	0.233	0.229	0.223	0.222	0.214	0.213	0.219	0.220
Maluku Utara	0.225	0.229	0.230	0.228	0.225	0.235	0.224	0.220	0.219	0.218	0.188	0.193	0.193	0.192
Papua Barat	0.187	0.182	0.176	0.171	0.168	0.166	0.169	0.204	0.308	0.327	0.194	0.189	0.182	0.175
Papua	0.412	0.370	0.530	0.493	0.491	0.442	0.445	0.423	0.317	0.268	0.227	0.205	0.197	0.211

Source: Central Bureau of Statistics (2017)